Express Mail Label No: EV30348985US
Docket No. CRO.01

SHEET MATERIAL HANDLING SYSTEM

RELATED APPLICATIONS

This application claims priority from United States Provisional Patent Application Serial No. 60/442,770, filed January 27, 2003, entitled "Sheet Material Handling System."

BACKGROUND OF THE INVENTION

Technical Field

The present invention is directed toward sheet material handling systems, and more particularly to a sheet material handling system with a pivoting planar work surface.

Background Art

Various types of sheet materials are used in the building and construction trade, with glass and drywall being two common examples. In addition, granite, marble and other cut stone sheet materials are used for specialized building purposes such as the fabrication of countertops. These more exotic sheet materials are particularly difficult to transport to a worksite and manipulate at the worksite due to the extraordinary weight of cut stone products and their relative fragility.

Typically large sized stone sheet stock is transported to a worksite horizontally on a flatbed truck or substantially vertically in a specially designed "A-frame" rack placed in the bed of a truck. Once at the worksite, the sheet materials must be removed from the truck and placed on a stand or other apparatus suitable for supporting the sheet materials while trimmed, cut or otherwise prepared for installation. The process of moving the sheet materials from the truck used for transport to the jobsite and then to a work area is difficult and time consuming due to the size, weight and relative fragility of the sheet materials. Several workmen or a crane may be necessary to move relatively large pieces of sheet material into a position where

cuts can be made. Not only does this present risk of injury to the workmen, but risk of damage to expensive sheet material slabs.

The present invention is directed toward overcoming one or more of the problems discussed above.

SUMMARY OF THE INVENTION

One aspect of the present invention is a sheet material handling system consisting of at least one support member having a substantially vertical support leg connected to a planar working surface by a hinged connection. The hinged connection allows pivoting of the planar work surface with respect to the vertical supports along a pivot axis. In addition, a latching member is associated with the planar working surface configured to selectively lock the pivoting of the planar working surface in a select position. The hinged connection between the planar working surface and the vertical support legs may consist of a first tubular member attached to each of the vertical support legs and a second tubular member attached to the planar working surface. The first and second tubular surfaces are operatively positioned in a line such that a connecting shaft can run through each tubular members. In this configuration, second tubular member and the attached planar working surface are free to pivot around the pivot axis with respect to the first tubular member.

The sheet material handling system may be constructed with a removable shaft. Removing the shaft would allow the separation of the planar working surface from the vertical support legs to increase the portability of the system.

The support member may also feature a horizontal base attached to each vertical support leg, the horizontal base being designed to provide stability. At least one wheel may be associated with each horizontal base. In addition, the wheel may have an attachment apparatus associated with it which allows the wheel to be selectively positioned above or below the level of the base. By positions the wheel below the level of the base the wheel supports the load of the system and any associated sheet materials and allows for relatively easy rolling of the entire system. If the wheel is positioned above the level of the base, the base rests on the support surface providing a stable work or transportation platform.

The planar work surface of the sheet material handling system can be fabricated in layers. One layer can be a substantially rigid support layer which provides support to the relatively fragile sheet materials during transportation or cutting. A second layer may be a relatively soft cutting surface constructed of a material which will not dull the blades used to cut and trim the sheet materials at the worksite.

It is an object of the present invention to provide a sheet material handling system which can effectively be used to both transport sheet materials and support them at the worksite as they are cut or trimmed for installation. In addition, it is an object of the present invention to provide a sheet material handling system which can be disassembled into component parts for easy transportation or storage. Furthermore, it is an object of the present invention to provide a sheet material handling system which can be configured to roll on attached wheels or rest solidly on its base at the discretion of the user.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of the sheet material handling system with the planar working surface pivoted into the transport position;

Fig. 2 is a side elevation view of the sheet material handling system showing the planar working surface pivoted into a horizontal working position and locked in place by the latching member;

Fig. 3 is a perspective view of the sheet material handling system showing the opposite side from that shown in Fig. 1;

Fig. 4 is a an exploded perspective view of the sheet material handling system; and

Fig. 5 is a cut-away perspective view of an alternate embodiment of a hinge structure of the sheet material handling system of Fig. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A sheet material handling system 10 includes at least one support member 12 with each support member 12 having a substantially vertical support leg 14. A planar working surface 16 is connected to each support leg 14 by a hinged connection 18. The hinged

connection 18 allows pivoting of the planar working surface 16 with respect to each vertical support leg 14 along a pivot axis 20.

In addition, a latching member 22 is operatively associated with the planar working surface 16. The latching member 22 has a first end 22A pivotally attached to a distal end of a horizontal base 34 and a second end 22B configured for attachment to a bracket 22C along a lengthwise edge of the underside of planar working surface 16. In the embodiment illustrated herein, the structure for attaching the second end 22B of the bracket 22C consists of a hole 22D in the second end 22B of the bar and a hole 22E in the bracket 22C which axially align with each other with the working surface horizontal. A pin 22F is selectively axially received in the holes to prevent movement of the working surface. As shown in Fig. 1, the latching member 22 can lay across the planar working surface 16 if the planar working surface 16 is pivoted into an upright position for transport, and provide support for the sheet materials being transported. As is best shown in Fig. 2, the latching member 22 can also be used to lock the planar working surface 16 in a substantially horizontal position suitable for performance of cutting or trimming operations on the sheet materials held by the sheet material handling system 10.

As is best shown in Fig. 3, the hinged connection 18 can consist of a first and second tubular members 24, 25 attached to each of the vertical support legs 14 and a third tubular member 26 attached to the planar work surface by means of brackets 28.

The assembled perspective view of Fig. 3 shows the first, second and third tubular members 24, 25, 26 positioned in an inline operative configuration. The first, second and third tubular members 24, 25, 26 are held in the operative position by a shaft 30 which is most clearly shown on the exploded view of Fig. 4. In the operative position the shaft 30 is placed axially through the tubular members 24-26. The first, second and third tubular members 24-26 and shaft 30 all lie along a pivot axis 20 in the operative configuration.

The support member 12 may also consist of a substantially horizontal base 34. At least one wheel 36 may be associated with each horizontal base 34. Each wheel 36 is attached to the base 34 by means of a wheel mounting mechanism 38. The wheel mounting mechanism 38 may provide for the adjustment of the vertical positioning of the wheel 36 with

respect to the base 34. As best seen in Fig. 3, the wheel mounting mechanism, if adjustable, may consist of a wheel bracket 40 a threaded shaft 42, a wheel bearing assembly 44 and the wheel 36.

The planar working surface 16 is preferably constructed with multiple layers. As best shown in the exploded view of Fig. 4, the planar working surface 16 has a structural base 45 consisting of ribs 46 and frame 48. Attached to the structural base 45 is a support surface 50. The support surface 50 is preferably constructed of a rigid material suitable for bearing loads. The final layer of the planar working surface 16 is a cutting surface 52 bonded to the support surface 50. The cutting surface 52 is fabricated from a material which will not dull the blades used to cut the sheet materials supported on the planar working surface 16. Support flanges 53 are spaced along each lengthwise edge to prevent sheet material from slipping off the planar work surface 16 as it is pivoted.

With the sheet material handing system 10 assembled as discussed above, the system functions as follows. Sheet material is loaded onto the planar working surface 16. The planar working surface 16 pivots via the hinged connection 18 with respect to the support legs 14. As shown in Fig. 3, the planar working surface 16 can be positioned in a semi-vertical orientation which is suitable for loading into the back of a truck and transporting sheet materials to a jobsite. Alternatively, as shown in Fig. 2, the planar working surface 16 can be pivoted to a substantially horizontal position and locked in that position by means of the latching member 22. In the horizontal work position the sheet material supported on the planar working surface 16 is in a position appropriate for cutting or other fabrication operations necessary prior to installation at a jobsite.

A key feature of the preferred embodiment of the sheet material handling system 10 is that it can be disassembled into components by removal of the shaft 30 from the first tubular member 24 attached to the support legs 14 and the second tubular member 26 attached to the planar working surface 16. The disassembly of the sheet material handling system 10 into components is readily visualized in Fig. 4, an exploded view representation.

In the preferred embodiment the support member 12 has a horizontal base 34 in addition to the vertical support leg 14. Ideally wheels 36 are connected to the horizontal base

34 by means of a wheel mounting mechanism 38 which allows for adjustment of the relative position of the wheels 36. If the wheels 36 are raised above the level of the base 34, the base rests firmly on a support surface whether it be the bed of a truck or the ground. Thus, the sheet material handling system 10 is held relatively immobile for safe transport or cutting operations. In the alternative, the wheels 36 can be lowered by means of the wheel mounting mechanism 38 below the level of the base 34. In this configuration the sheet material handling system 10 and associated sheet materials can be wheeled to various locations on the jobsite or into and out of the truck used for transportation.

One embodiment of a wheel mounting mechanism 40 which provides for positioning of the wheels 36 as described above is shown in Figs. 2 and 3. In the represented embodiment the wheel mounting mechanism 38 consists of a wheel bracket 40 holding a threaded shaft 42 which is attached at its upper end to a knob 43. The lower end of the threaded shaft 42 is attached to a wheel bearing assembly 44 which provides for both the rotation of the wheels 36 around their axles 54 and the rotation of the wheels 36 and bearing assembly 44 around the axis defined by the threaded shaft 42. The wheels 36 can be raised or lowered by turning the knob 43 which drives the threaded shaft 42 up or down with respect to the wheel bracket 40 effectively raising or lowering the wheels 36 below or above the level of the horizontal base 34.

Fig. 5 illustrates an alternate and preferred structure of the hinge 18. In this embodiment the ribs 46 have a substantial depth and a hole 80 is formed in each rib along the pivot axis 20. Also along the pivot axis 20 a hole 82 is formed at a distal end of each vertical support leg 14. With the holes 80, 82 axially aligned, tube 84 is axially inserted there through and then welded or otherwise secured to each rib and the vertical support 14. A band saw or other suitable cutting device is used to cut the tube 84 as illustrated at 86 on either side of the vertical supports 14. A shaft 30 is then axially inserted along the pivot axis 20 within the tube 84 to provide a pin for the hinge. This method of manufacturing the hinge 18 is quicker, easier and less costly than the hinge structure illustrated in Figs. 2-4.

The ribs 46, frame 48, vertical supports 14 and the base 34 maybe manufactured of steel for superior strength or aluminum in order to minimize the weight of the table in

accordance with intended usage and user preferences. Obviously, aluminum is significantly lighter than steel and therefore makes the table easier to transport and handle.

The sheet metal handling system of the present invention can be fabricated out of conventional materials thus minimizing cost. It provides an extremely rigid platform in either its vertical or horizontal orientation. The latching member, securing the inner working surface at its lengthwise edge provides for extreme stability of the working surface in its horizontal position and then conveniently functions as a retainer for maintaining the planar working surface 16 in its upright transport position. Furthermore, because the table can be readily disassembled by removal of the shaft, the table can be readily packed and transported when not used for conveying sheet material.